

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV 11-96)		ATTORNEY'S DOCKET NUMBER YMR-214
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		
INTERNATIONAL APPLICATION NO. PCT/JP00/00179	INTERNATIONAL FILING DATE 17 January 2000	PRIORITY DATE CLAIMED 18 January 1999
TITLE OF INVENTION OPTICAL DISK REPRODUCING DEVICE		
APPLICANT(S) FOR DO/EO/US Naoki YUMIYAMA		
<p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <ol style="list-style-type: none"> <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). <input type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, the application was filed in the United States Receiving Office (RO/US). <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). <input checked="" type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). (Claims Only) 		
<p>Items 11. to 16. below concern document(s) or information included:</p> <ol style="list-style-type: none"> 11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input checked="" type="checkbox"/> Other items or information: PCT Request; Written Opinion (PCT/IPEA/408) . 		
<p>PLEASE ACCEPT THIS AS AUTHORIZATION TO DEBIT OR CREDIT FEES TO DEP ACCT. 16-0331 PARKHURST & WENDEL</p>		

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INTERNATIONAL APPLICATION NO
PCT/JP00/00179ATTORNEYS DOCKET NUMBER
YMR:21417. The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :**

Neither international preliminary examination fee (37 CFR 1.482)
 nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
 and International Search Report not prepared by the EPO or JPO \$1,000.00
 International preliminary examination fee (37 CFR 1.482) not paid to
 USPTO but International Search Report prepared by the EPO or JPO \$860.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but
 international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$760.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)
 but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)
 and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT = \$ 860.00

Surcharge of \$130.00 for furnishing the oath or declaration later than 20 30 months from the earliest claimed priority date (37 CFR 1.492(e)).

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	4 - 20 =	0	X \$18.00 \$
Independent claims	2 - 3 =	0	X \$80.00 \$
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00 \$

TOTAL OF ABOVE CALCULATIONS = \$ 860.00

Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).

SUBTOTAL = \$ 860.00

Processing fee of \$130.00 for furnishing the English translation later than 20 30 months from the earliest claimed priority date (37 CFR 1.492(f)).

TOTAL NATIONAL FEE = \$ 860.00

Fee for recording the enclosed assignment (37 CFR 1.21(b)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

+ \$ 40.00

TOTAL FEES ENCLOSED = \$ 900.00

Amount to be: \$

refunded \$

charged \$

a. A check in the amount of \$ 900.00 to cover the above fees is enclosed. CK# 14246

b. Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 16-0331. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
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NAME

25,177

REGISTRATION NUMBER

09/889230
JC18 Rec'd PCT/PTO 13 JUL 2001

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Naoki YUMIYAMA et al.

Serial No.: New Application

Filed: July 13, 2001

For: OPTICAL DISK REPRODUCING DEVICE

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application,
please enter the following specification changes as noted below:

IN THE CLAIMS:

Please add new claims 3 and 4 below:

3. (New) A method of spin-up processing employed in
reproducing a disk-shaped recording medium on which recording is
made, in which control of a spindle motor is accomplished by CAV

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control during a process from the start of the spin-up processing to a read standby state, said method comprising the steps of:

setting the spindle motor to be driven under the CAV control;

performing servo adjustment and then acquiring a LEAD-IN final address;

conducting CLV measurement and then setting an angular velocity to be slower than a maximum rotational speed to perform a predetermined processing; and

performing HOLD TRACK.

4. (New) The method of spin-up processing according to claim 3, wherein said angular velocity slower than a maximum rotational speed is a half of the maximum rotational speed.

REMARKS

Claims 1-4, as amended, remain herein. Claims 3 and 4 have been added hereby.

This Preliminary Amendment is submitted to conform the U.S. patent application to the international application.

Examination of this application on its merits is respectfully requested.

Respectfully submitted,

PARKHURST & WENDEL, L.L.P.

July 13, 2001
Date



Roger W. Parkhurst
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RWP/ame

Attorney Docket No. YMOR:214

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DESCRIPTION

OPTICAL DISK REPRODUCING DEVICE

5 Technical Field

The present invention relates to an optical disk reproducing device (International Patent Classification G11B 7/00), and particularly to an optical disk reproducing device in which spin-up processing of the optical disk 10 reproducing device and a method of controlling rotation of a spindle motor during low-speed rotation of the optical disk are carried out by CAV control (constant angular velocity control).

15 Background Art

Such an optical disk reproducing device is configured as shown in FIG. 2.

An optical disk 1 is rotationally driven by a spindle motor 2. An optical head 3 reading information from the 20 optical disk 1 is driven by a traverse motor 4 in a radial direction of the optical disk 1.

An output signal of the optical head 3 is inputted to a DSP (digital signal processor) 5 via an amplifier 4. The 25 DSP 5 controls the focus of the optical head 3 via an actuator driver 6 so as to suitably set the focus of the optical head 3. Further, the DSP 5 controls both of a spindle motor 2 and a traverse motor 4 via a spindle traverse driver 7 so as to suitably drive the motors 2, 4.

A CPU 8 is a central processing unit which is operated 30 by a control program and sends an instruction to make the DSP 5 carry out desired processing. An ECC & I/F9 has an ECC (error-checking and correction) function and an interface function and is a device for controlling the communication with a host computer. A DRAM 10 is a memory for temporarily

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storing read data. Reference numeral 11 denotes a system control processing section.

Incidentally, as for an optical disk, the following method has been generally adopted: information is recorded
5 with an equal density entirely from an inner periphery to an outer periphery. In an optical disk reproducing device for reproducing such an optical disk, as for spindle motor rotation control during spin-up processing, a method using CLV control (constant linear velocity control) has been known
10 in general. The CLV control is a method of changing the number of rotations according to a position of an optical head in a radial direction and obtaining a constant length of a track, which is read by the optical head in a unit time.

FIG. 3 is a flowchart showing the above processing.

In step S1, setting is made to drive the spindle motor
15 2 at a constant linear velocity by CLV control. In step S2, servo adjustment is carried out. In step S3, a LEAD-IN final address is acquired. In step S4, CLV measurement is carried out at the above address by CLV control.

20 In step S5, control is accomplished such that the spindle motor 2 is switched from CLV control to CAV control and a constant angular velocity is obtained.

25 In step S6, an angular velocity is changed to a half of a maximum rotational speed (twelve-speed at a maximum of twenty-four-speed).

In step S7, TOC (table of contents) serving as index information of the disk is read.

30 In step S8, SUB-Q (additional information for providing data with a high-level function) less than 00:02.00 is acquired.

In step S9, a HEADER difference is acquired based on the SUB-Q of step S8 and READ SET is carried out.

In step S10, the velocity changed in step S6 is reset and HOLD TRACK is carried out.

As described above, when processing before a read standby state is carried out using CLV control (constant linear velocity control), the number of rotations on the inner periphery and the outer periphery is changed according to the
5 position of the optical head. Therefore, it is always necessary to monitor data recorded in the optical disk.

Thus, when the optical head is out of focus or tracking, it is not possible to find a present rotational speed. Therefore, it is necessary to reduce the number of rotations
10 of the optical disk to carry out re-pull-in of CLV, resulting in a problem of a longer spin-up time.

Disclosure of Invention

An object of the present invention is to provide an
15 optical disk reproducing device configured such that even if an optical head is out of focus, an operation for re-pull-in of CLV is not necessary, and it is possible to shorten the time to wait for the rotation of an optical disk, shorten the seek time to arrive at inner and outer peripheries, accomplish
20 stable control, and shorten the spin-up time.

According to the optical disk reproducing device of the present invention that is devised to solve the above problem, processing before a read standby state is divided into steps and all the steps are carried out by CAV control (constant
25 angular velocity control).

According to the above configuration, even if the optical head is out of focus, it is not necessary to change the number of rotations. Therefore, unlike CLV control, it is not necessary to reduce the number of rotations of the optical
30 disk to carry out re-pull-in of CLV. Further, since the time is shorter to wait for the rotation of the optical disk, it is possible to shorten the seek time to arrive at the inner and outer peripheries, accomplish stable control, and shorten the spin-up time.

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An optical disk reproducing device according to claim 1 of the present invention is characterized in that the control of a spindle motor is accomplished by CAV control (constant angular velocity control) during a process from a 5 start of the spin-up processing to the read standby state in the optical disk reproducing device for reproducing disk-shaped recording media, on which recording is made with a constant linear velocity.

According to the configuration of the present invention, 10 even if the optical head is out of focus or tracking, it is not necessary to reduce the number of rotations of the optical disk to carry out re-pull-in of CLV. Further, since the time to wait for the rotation of the optical disk is reduced, it is possible to shorten the seek time to arrive at the inner 15 and outer peripheries and to accomplish stable control.

An optical disk reproducing device according to claim 2 of the present invention is characterized in that, in claim 1, the control of the spindle motor is accomplished by CAV control (constant angular velocity control) during a control 20 processing when the disk-shaped recording media rotates at a low speed.

Brief Description of Drawings

FIG. 1 is a flowchart showing spin-up control processing 25 in an optical disk reproducing device of the present invention;

FIG. 2 is a typical block diagram showing an optical disk reproducing device; and

FIG. 3 is a typical flowchart showing spin-up control 30 processing in the optical disk reproducing device.

Best Mode for Carrying Out the Invention

Referring to FIG. 1, an embodiment of the present invention will be described below.

Here, since the configuration of the hardware is identical to FIG. 2 showing the conventional art, the explanation will be made with the same reference numerals.

FIG. 1 shows system control processing from physical
5 spin-up processing to a read standby state in an optical disk reproducing device of the present invention.

In step S1, setting is made to drive a spindle motor 2 by CAV control (constant angular velocity control) instead of conventional CLV control (constant linear velocity
10 control). In step S2, servo adjustment is carried out. In step S3, a LEAD-IN final address is acquired. In step S4, CLV measurement is carried out.

In step S5, an angular velocity is changed to a half of a maximum rotational speed (twelve-speed at a maximum of
15 twenty-four-speed).

In step S6, TOC (table of contents) serving as index information of the disk is read.

In step S7, SUB-Q (additional information for providing data with a high-level function) less than 00:02.00 is
20 acquired.

In step S8, a HEADER difference is obtained based on the SUB-Q of step S7 and READ SET is carried out.

In step S9, the velocity changed to a half in step S5 is reset and HOLD TRACK is carried out.

25 According to the above configuration, since all the steps are carried out by CAV control, it is possible to shorten the time to wait for the rotation and the seek time.

As described above, according to the optical disk reproducing device of the present invention, when reproducing
30 the optical disk having information recorded on the entire surface with an equal density, the process from the start of spin-up processing to the read standby state is entirely carried out by CAV control. Thus, even if the optical head is out of focus, it is possible to keep a stable number of

rotations, reduce the time to wait for the rotation, and shorten the seek time, resulting in a shorter spin-up time.

CLAIMS

1. An optical disk reproducing device for reproducing a disk-shaped recording medium on which recording is made with
5 a constant linear velocity,
characterized in that control of a spindle motor is accomplished by CAV control during a process from a start of spin-up processing to a read standby state.
- 10 2. The optical disk reproducing device according to claim 1, wherein control of said spindle motor is accomplished by CAV control during a control processing when said disk-shaped recording medium rotates at a low speed.

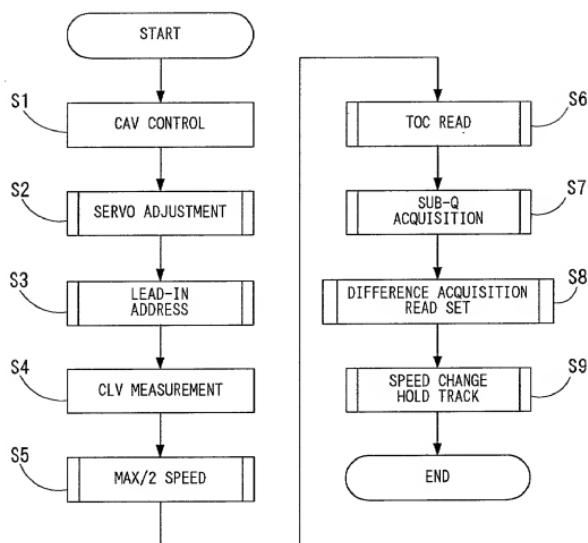
00885230.0074301

ABSTRACT

An optical disk reproducing device such that even if the optical head is out of focus, it is unnecessary to carry out
5 re-pull-in of CLV, the time to wait for the rotation of the optical disk is short, the seek time for the optical head to arrive at the inner periphery is short, the control is stable, and the spin-up time is short. The control of a spindle motor in processing from the start of the spin-up processing until
10 the read standby state is brought about is all performed in the CAV control (angular velocity constant control).

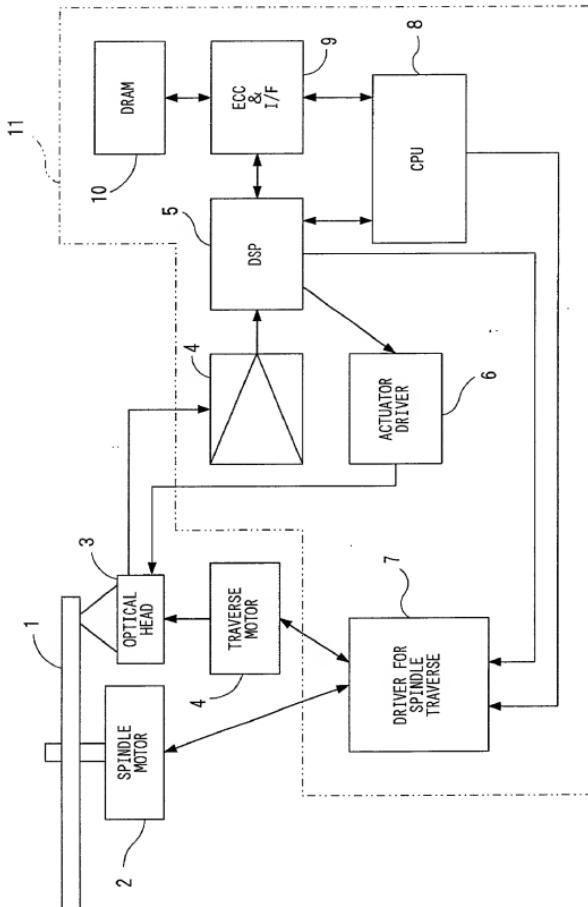
1 / 3

FIG. 1



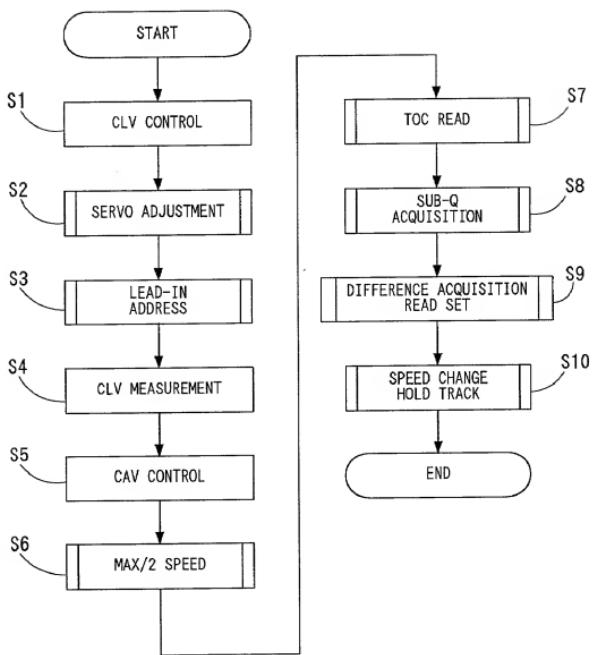
TOP SECRET//NOFORN//REF ID: A6268860

FIG. 2



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FIG. 3



**Declaration and Power of Attorney
Under Patent Cooperation Treaty
35 USC §371(c)(4)**

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe that I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural names are named below) of the invention entitled: OPTICAL DISK REPRODUCING DEVICE

described and claimed in the international application number PCT/JP00/00179 filed January 17, 2000 and as amended on November 24, (if any), the specification and claims of which I have reviewed and understand and for which I solicit a patent. 2000

I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a), and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to my international application by me or my legal representatives or assigns, except as follows:

Japanese Patent Application No. 11-008583 filed on January 18, 1999

The priority of the above applications (if any), filed within a year prior to my international application is hereby claimed under 35 USC 119. I hereby appoint the following as my attorneys of record with full power of substitution and revocation to prosecute this application and to transact all business in the patent office:

Roger W. Parkhurst, Reg. No. 25,177; Charles A. Wendel, Reg. No. 24,453; Lawrence D. Eisen, Reg. No. 41,009.

ALL CORRESPONDENCE IN CONNECTION WITH THIS APPLICATION SHOULD BE SENT TO:
PARKHURST & WENDEL, L.L.P., 1421 PRINCE STREET, SUITE 210, ALEXANDRIA, VIRGINIA 22314-2805, TELEPHONE (703) 739-0220.

I hereby declare that I have reviewed and understand the contents of this Declaration, and that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

3. Full Name of Sole Inventor	<u>Naoki</u>	Given Name	Middle Initial	YUMIYAMA
				Family Name
*4. Inventor's Signature	<u>Naoki</u>	<u>YumiYama</u>		
Date of Signature	<u>June</u>	28,	2001	
	Month	Day	Year	
6. Residence	202 Ikeda Bldg., 682-1, Fukuonjimachi, Matsuyama-shi, Ehime 790-0921 Japan			
	City	State or Province	Country	
7. Citizenship	Japanese			
8. Post Office address (Insert complete mailing address, including country)	<u>c/o MATSUSHITA-KOTOBUKI ELECTRONICS INDUSTRIES, LTD.</u> <u>8-1, Furujin-machi, Takamatsu-shi, Kagawa 760-0025 Japan</u>			

*IF THERE IS MORE THAN ONE INVENTOR USE PAGE 2 AND PLACE AN "X" HERE□.